#9 Appeal Brief
T Young
11-21-02

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT
APPEALS AND INTERFERENCES

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Applicants:	I hereby certify that this paper is being deposited with the United States Postal Service as first class mail, postage pre-paid, in an envelope addressed to: Commissioner for Patents, Washington, DC 20231 on this date:
Karbasssi, et al.	
Serial No.: 09/634,507	
Filed: August 9, 2000	
For: **FLOW SENSOR PACKAGE**	
Group Art Unit: 2855	
Examiner: L. Martir	October 22, 2002 (Date)
Attorney Docket No.: M10-25086-US	Trevor B. Joike Reg. No. 25,542 Attorney for Applicants

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APPELLANTS' BRIEF

Commissioner for Patents
Washington, DC 20231

Sir:

Pursuant to the provisions of 37 CFR §1.192, Appellants submit the following brief.

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1. Real Party in Interest

The real party in interest is Honeywell International, Inc. of Morristown, N.J.

2. Related Appeals and Interferences

There are no other appeals and interferences known to Appellants, Appellants' legal representatives or assignees which will directly affect or be affected by or have a bearing on the Board's decision in the pending appeal.

3. Status of Claims

Claims 1-4, 6, 7, 9, and 11-24 are pending in the application and are under final rejection. The final rejection of claims 1-4, 6, 7, 9, and 11-24 is appealed.

4. Status of Amendments

All amendments have been entered.

5. Summary of the Invention

As shown in the drawings, a flow sensor package 10 includes a housing 12 that has an inlet port 14, an outlet port 16, a lead 18a, a first channel 20 and 22, and a second channel 21 and 23. The first channel 20 and 22 communicates with the inlet port 14 and the outlet port 16, and the second channel 21 and 23 also communicates with the inlet port 14 and the outlet port 16. The inlet port 14 receives a fluid, and the outlet

port 16 discharges the fluid from the flow sensor package 10, although the flow sensor package 10 can be bidirectional as shown by the arrows in Figures 1a and 1b. The lead 18a is coupled to a measuring apparatus 26.

The second channel 21 and 23 has a restriction 28. The first channel 20 and 22 has a pressure sensing element 30 such as a pressure transducer with a conductive elastomeric seal. The pressure sensing element 30 detects a pressure change created by the restriction 28 and is coupled to the lead 18a through the conductive elastomeric seal.

The restriction 28 in the second channel 21 and 23 creates a pressure drop from one face of the pressure sensing element 30 to the other in the first channel 20 and 22. The pressure sensing element 30 and elastomeric seal prevent flow of the fluid through the first channel 20 and 22, and the pressure sensing element 30 measures the pressure drop created by the restriction 28. The pressure sensing element 30 sends a signal to the measuring apparatus 26 through the lead 18a.

As shown in Figure 2, an elastomeric seal 32 is provided in the housing 12 and has a conductive path from the sensing element 30 to the lead 18a. The housing 12 also has an alignment well 34 in the first channel 20 and

22. The housing 12 has only two portions, a base 36 and a cover 38. The base 36 includes the alignment well 34, the channels 20 and 21, and the inlet port 14, and the cover 38 includes the outlet port 16 and the channels 22 and 23.

The alignment well 34 supports the elastomeric seal 32, another elastomeric seal 40, and the pressure sensing element 30. The pressure sensing element 30 is positioned between the elastomeric seals 32 and 40 in order to prevent flow through the first channel 20 and 22. The pressure sensing element 30 is oriented so that it is electrically coupled to the conductive elastomeric seal 32 and so that the elastomeric seal 40 rests on the pressure sensing element 30.

An additional elastomeric seal 44 prevents leakage of the fluid from the second channel 21 and 23, thereby allowing the restriction 28 to create a pressure change across the pressure sensing element 30. The pressure sensing element 30 measures the pressure change across the pressure sensing element 30 and provides an electrical output signal to the conductive elastomeric seal 32. The conductive elastomeric seal 32 is electrically coupled to the measuring apparatus 26 through the lead 18a so that the signal from the pressure

sensor element 30 reaches the measuring apparatus 26. Along with the elastomeric seal 40, the conductive elastomeric seal 32 prevents leakage of the fluid from the first channel 20 and 22.

With this arrangement, the pressure sensing element 30 is integrated with the restriction 28 in the housing 12 and is sealed by elastomeric seals 32 and 40 to form a low-cost, highly-manufacturable flow sensor package 10 to measure the flow rate of a fluid.

Figure 3 shows an alternate embodiment in which the first channel 20 and 22 and the second channel 21 and 23 are not parallel to one another.

6. Issues

Issue 1 - Whether claims 1, 2, 6, 7, 9, 11, 12, and 15-23 are anticipated under 35 U.S.C. §102(b) by Frick, U.S. Patent No. 4,466,290 (hereinafter, "the Frick '290 patent").

Issue 2 - Whether claims 3, 4, 13, 14, and 24 are unpatentable under 35 U.S.C. §103 over the Frick '290 patent.

7. Grouping of Claims

For purposes of this appeal, claims 1, 2, 6, 7, and 9 may be grouped together, claims 11, 12, 15, and 17 may be grouped together, and claims 20-22 may be grouped together.

Otherwise, the appealed claims are treated separately.

8. Argument

The Frick '290 Patent

The Frick '290 patent discloses a pressure transmitter 10 having four major (and separate) components, an input/output unit 12, a pressure transducer 14, a flange 16, and an orifice 28/30. The input/output unit 12 is connected to the pressure transducer 14 by a neck 18. The flange 16 is connected by pipes 24 and 26 to the orifice 28/30, and the flange 16 is mounted to the pressure transducer 14 by bolts 27.

The pipe 24 is connected to one side of the orifice 28/30, and the pipe 26 is connected to the other side of the orifice 28/30. The orifice 28/30 provides a pressure drop as a function of flow through a conduit 32. The pipe 24 is connected to a passageway 36 in the flange

16, and the pipe 26 is connected to a passageway 38 in the flange 16.

The passageways 36 and 38 couple the pipes 24 and 26 to fluid chambers 40 and 42 of the flange 16. The fluid chambers 40 and 42 cooperate with first and second pressure sensing and transmitting means formed in the pressure transducer 14 when the flange 16 and the pressure transducer 14 are mated together. The first and second pressure sensing and transmitting means comprise isolation diaphragms 50 and 52 disposed in the pressure transducer 14.

The isolation diaphragms 50 and 52 are joined at their rims 54 and 54A to the pressure transducer 14. Seals 58, such as O-ring seals, are interposed between the pressure transducer 14 and the flange 16 annular to the rims 54 and 54a of the isolation diaphragms 50 and 52 in order to seal the fluid chambers 40 and 42.

Fluid cavities 61 and 63 are formed in the transducer 14 such that the isolation diaphragm 50 isolates the fluid chamber 40 from the fluid cavity 61 and such that the isolation diaphragm 52 isolates the fluid chamber 42 from the fluid cavity 63. Fluid conduits 62 and 64 couple the fluid cavities 61 and 63 to a sensor element 66 of the input/output unit 12. The

fluid conduits 62 and 64 are filled with a substantially incompressible fluid 65. A measuring diaphragm 72 of the sensor element 66 separates chambers 68 and 70.

A differential pressure is developed by the orifice 28/30 and is conveyed by the pipes 24 and 26 through the passageways 36 and 38 to the chambers 40 and 48 where the differential pressure acts on the isolation diaphragms 50 and 52. This differential pressure deflects the isolation diaphragms 50 and 52 to create a differential pressure in the fluid cavities 61 and 63, and this differential pressure is transmitted through the incompressible fluid 65 in the fluid conduits 62 and 64 to the chambers 68 and 70 of the sensor element 66. The sensor element 66 is externally excited by input/output unit 12 via the electrical leads 74. In response to the differential pressure in the chambers 68 and 70, the measuring diaphragm 72 deflects to vary the capacitance of the sensor element 66, which alters the external exciting signal. This change in the exciting signal is representative of the differential pressure and is transmitted through the electrical leads 74 and through the input/output unit 12 to external leads 15.

Alternatively, the Frick '290 patent discloses that the sensor element 66 may be located near the

isolation diaphragms 50 and 52 and may be supported in the transducer 14 instead of in the input/output unit 12. The Frick '290 patent also discloses that the first and second pressure sensing and transmitting means may directly sense fluid pressure such as when they comprise strain gauges. However, the Frick '290 patent does not disclose how the pressure transducer 14 is to be modified to accommodate such alternatives.

The Frick '290 patent further discloses that a calibration manifold 17 may be used instead of the flange 16 between the pipes 24, 26 and the pressure transducer 14. The calibration manifold 17 includes three valves 84, 86, and 88 that may be adjusted to permit calibration of the pressure transmitter 10.

Issue 1

Independent claim 1 is directed to a flow sensor package having a housing, a sensing element, a restriction, and a seal. The housing has an inlet, an outlet, and first and second channels in communication with the inlet and the outlet. The sensing element is in the first channel, and the restriction is in the second channel. The seal engages the sensing element so as to prevent flow of a fluid past the sensing element, the

seal has an electrically conductive path from the sensing element to a lead, and the lead is outside of the housing.

The seal of independent claim 1 has two attributes. First, the seal engages a sensing element that is in a first channel, where the first channel is in fluid communication with (i) an inlet, (ii) an output, and (iii) a second channel containing a restriction. Second, the seal has an electrically conductive path from the sensing element to a lead that is outside of the housing.

The Frick '290 patent discloses no seal that has both of these attributes.

The Examiner asserts that the seal recited in independent claim 1 comprises the diaphragms 50 and 52 disclosed in the Frick '290 patent. The Examiner further asserts that the sensing element recited in independent claim 1 is the sensing element 66 disclosed in the Frick '290 patent. However, the diaphragms 50 and 52 do not engage the sensing element 66 so as to prevent flow of a fluid past the sensing element 66, as required by independent claim 1.

Moreover, the diaphragms 50 and 52 do not include an electrically conductive path from the sensing

element 66 to a lead that extends outside of the housing as also required by independent claim 1.

Furthermore, the sensing element 66 is not in a channel that is in fluid communication with the channel containing the restriction, as required by independent claim 1. Indeed, the diaphragms 50 and 52, as disclosed in the Frick '290 patent, isolate the sensing element 66 from the channel 24/26 that contains the restriction.

Accordingly, based on the Examiner's own interpretation of the Frick '290 patent, the Frick '290 patent does not anticipate independent claim 1.

Alternatively, the Examiner could have suggested that the diaphragms 50 and 52 are the sensing element and that the seals 58 are the seal recited in independent claim 1. This suggestion, at least, has the advantages that the seals 58 engage the diaphragms 50 and 52 and that the diaphragms 50 and 52 are in fluid communication with the channel containing the restriction. However, there is no disclosure in the Frick '290 patent that the seals 58 have an electrically conductive path from the diaphragms 50 and 52 to a lead that extends outside of the housing.

Accordingly, even if this interpretation of the Frick '290 patent is used, the Frick '290 patent still does not anticipate independent claim 1.

The Examiner also points to the electrical leads 74. However, the Examiner does not show how any seal has a conductive path to these leads. Indeed, the Frick '290 patent discloses no such seal.

Accordingly, for all of the above reasons, the Frick '290 patent does not anticipate independent claim 1.

Independent claim 11 is directed to a flow sensor package having a housing, an inlet, an outlet, first and second channels in communication with the inlet and the outlet, a sensing element in the first channel, a restriction in the second channel, and a seal engaging the sensing element so as to prevent flow of the liquid past the sensing element. The sensing element has first and second opposing sides, the first side is in fluid communication with the inlet, and the second side is in fluid communication with the outlet. The sensing element senses a pressure change across the restriction. The restriction permits flow of a liquid through the inlet, the second channel, and the outlet.

The Frick '290 patent does not disclose a sensing element with first and second opposing sides and that meets the limitations of the claims. The sensing element 66 disclosed in the Frick '290 patent appears to have first and second opposing sides. However, the sensing element 66 is not in a first channel that is in fluid communication with a second channel containing a restriction as required by independent claim 11. Indeed, the channel containing the sensing element 66 is sealed from the restricted channel disclosed in the Frick '290 patent by the isolation diaphragms 50 and 52.

Moreover, if the sensing element 66 disclosed in the Frick '290 patent is chosen as the sensing element recited in independent claim 11, then the Frick '290 patent discloses no seal that engages the sensing element 66 and that prevents flow of the liquid past the sensing element 66, as recited in independent claim 11.

Furthermore, the diaphragms 50 and 52 do not comprise the sensing element of independent claim 11 because they do not have opposing sides in fluid communication with the inlet and outlet. Indeed, the sides of the diaphragms 50 and 52 that are in fluid communication with the restriction point in the same direction and, therefore, are not opposing.

Accordingly, the Frick '290 patent does not anticipate independent claim 11.

Independent claim 20 is directed to a method of determining flow rate through a flow conductor in which a pressure change is created within a housing having only two separate housing portions, the pressure change is sensed using a sensing element mounted within the housing, the sensing element is sealed within the housing using a seal, and an electrical signal is communicated from the sensing element to an exterior of the housing.

With regard to independent claim 20, the Examiner asserts that independent claim 20 exists as an essential constituent of the claimed invention and, therefore, is inherently disclosed by the teachings of the Frick '290 patent. This assertion rests on the assumption that independent claim 20 is similar to independent claims 1 and 11. Even if this assertion were true, the Frick '290 patent cannot inherently disclose the method recited in independent claim 20 because the Frick '290 patent does not disclose the inventions of independent claims 1 and 11, as discussed above.

However, this assumption is not true because, unlike independent claim 1 and 11, independent claim 20 recites that a pressure change is created within a

housing, the pressure change is sensed using a sensing element mounted within the housing, the sensing element is sealed within the housing using a seal, an electrical signal is communicated from the sensing element to an exterior of the housing, and the housing has only two separate housing portions. The Frick '290 patent specifically discloses an arrangement having more housing portions than recited in independent claim 20. Therefore, independent claim 20 is not disclosed in the Frick '290 patent.

That is, in the Frick '290 patent, the pressure change is created in the orifice 28/30, the sensing of the pressure change and the communicating of an electrical signal from the sensing element to an exterior of the housing require a third portion, i.e., the input/output unit 12, and the transmission of the pressure change from the orifice 28/30 to the sensing element requires two additional housing portions, i.e., the flange 16 (or manifold 17) and the pressure transducer 14. Accordingly, the Frick '290 patent discloses four housing portions to meet the requirements of independent claim 20. However, independent claim 20 is restricted to only two housing portions.

The Examiner appears to be arguing that the manifold 17 creates the pressure change that can be used to indicate flow rate as required by independent claim 20. However, as disclosed in the Frick '290 patent, the orifice 28/30 creates the pressure change in response to the flow rate through the conduit 32. While the valves 84, 86, and 88 do form restrictions when they are not fully open, there is no disclosure in the Frick '290 patent that such valves provide a pressure change that can be used to indicate flow rate.

Therefore, for all of the reasons given above, the Frick '290 patent does not anticipate independent claim 20.

Because the Frick '290 patent does not anticipate independent claims 1, 11, and 20 of the present application, the Frick '290 patent likewise does not anticipate dependent claims 2, 6, 7, 9, 12, 15-19, and 21-23 of the present application.

Additionally, dependent claim 16 further recites that the seal of independent claim 11 has a conductive path from the sensing element to a lead, and that the lead extends outside of the housing. As discussed above, the Frick '290 patent does not disclose a seal having a conductive path from the sensing element

to a lead, and further does not disclose that the lead extends outside of the housing.

Moreover, the diaphragms 50 and 52 are not the seal recited in dependent claim 16 because the diaphragms 50 and 52 do not engage a sensing element so as to prevent flow of a fluid past the sensing element. Also, the sensing element 66 is not in a first channel that is in fluid communication with a second channel containing the restriction. Therefore, even if the sensing element 66 does have a seal, this seal would not meet the limitations of dependent claim 16. (It is noted that, as discussed above, there is no disclosure in the Frick '290 patent that the sensing element 66 has a seal.)

Accordingly, the Frick '290 patent does not anticipate dependent claim 16.

Dependent claim 18 further recites that the seal of independent claim 11 has a conductive path from the sensing element to a lead, and that the lead extends outside of the housing. As discussed above, the Frick '290 patent does not disclose a seal having a conductive path from the sensing element to a lead, and further does not disclose that the lead extends outside of the housing.

Accordingly, the Frick '290 patent does not anticipate dependent claim 18.

Dependent claim 19 further recites that the seal of independent claim 11 has a conductive path from the sensing element to a lead, and that the lead extends outside of the housing. As discussed above, the Frick '290 patent does not disclose a seal having a conductive path from the sensing element to a lead, and further does not disclose that the lead extends outside of the housing.

Accordingly, the Frick '290 patent does not anticipate dependent claim 19.

Dependent claim 23 further recites the communication of the electrical signal from the sensing element through the seal to an exterior of the housing. As discussed above, the Frick '290 patent does not disclose a seal that conducts an electrical signal from the sensing element to an exterior of the housing.

Accordingly, the Frick '290 patent does not anticipate dependent claim 23.

Issue 2

Dependent claims 3, 4, 13, and 14 recite that the seal comprises a pair of elastomeric seals, that the

sensing element is captured between the elastomeric seals, and that the elastomeric seals are arranged to prevent leakage between the base and cover. The Frick '290 patent discloses very little about seals, mentioning only that O-rings may be used to provide various seals. There is certainly no suggestion in the Frick '290 patent that the seals be provided in pairs with the sensing element being captured between the two seals. Moreover, there is no suggestion in the Frick '290 patent that the seals be elastomeric seals.

Without such suggestions, dependent claim 3, 4, 13, and 14 cannot be obvious over the Frick '290 patent.

Dependent claim 24 recites that the seal comprises an elastomeric seal. There is no suggestion in the Frick '290 patent that any seals disclosed therein be elastomeric seals.

Without such a suggestion, dependent claim 24 cannot be obvious over the Frick '290 patent.

For the foregoing reasons, reversal of the Final Rejection is respectfully requested.

9. Appendix

The Appendix containing a copy of the claims involved in this appeal is attached hereto.

This brief is being filed in triplicate as required by 37 C.F.R. §1.192.

The fee set forth in 37 C.F.R. §1.17(c) is enclosed herein by check. The Commissioner is hereby authorized to charge any deficiency in the amount enclosed or any additional fee which may be required to Deposit Account No. 50-1519.

Respectfully submitted,

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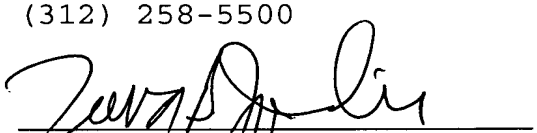
By: 

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October 22, 2002

APPENDIX

1. A flow sensor package comprising:

a housing having an inlet, an outlet, and first and second channels in communication with the inlet and the outlet;

a sensing element in the first channel;

a restriction in the second channel; and

a seal engaging the sensing element so as to prevent flow of a fluid past the sensing element, wherein the seal has an electrically conductive path from the sensing element to a lead, and wherein the lead is outside of the housing.

2. The flow sensor package of Claim 1, wherein the housing includes a base and a cover.

3. The flow sensor package of Claim 2, wherein the seal comprises a pair of elastomeric seals, wherein the sensing element is captured between the elastomeric seals, and wherein the elastomeric seals are arranged to prevent leakage between the base and cover.

4. The flow sensor package of Claim 1, wherein the seal comprises a pair of elastomeric seals, and wherein the sensing element is captured between the elastomeric seals.

6. The flow sensor package of Claim 1, wherein the fluid is a liquid or a gas.

7. The flow sensor package of Claim 1, wherein the inlet, the outlet, and the second channel are arranged to permit a flow of the fluid through the housing between the inlet and the outlet, and wherein the sensing element is arranged to sense a pressure change across the restriction.

9. The flow sensor package of Claim 1, wherein the inlet, the outlet, and the second channel are arranged to permit a bidirectional flow of the fluid through the housing between the inlet and the outlet, and wherein the sensing element is arranged to sense a pressure change across the restriction.

11. A flow sensor package comprising:

a housing, an inlet, an outlet, and first and second channels in communication with the inlet and the outlet;

a sensing element in the first channel, wherein the sensing element has first and second opposing sides, wherein the first side is in fluid communication with the inlet, and wherein the second side is in fluid communication with the outlet;

a restriction in the second channel, wherein the restriction permits flow of a liquid through the inlet, the second channel, and the outlet; and

a seal engaging the sensing element so as to prevent flow of the liquid past the sensing element, wherein the sensing element senses a pressure change across the restriction.

12. The flow sensor package of Claim 11, wherein the housing includes a base and a cover.

13. The flow sensor package of Claim 12, wherein the seal comprises a pair of elastomeric seals, wherein the sensing element is captured between the elastomeric seals, and wherein the elastomeric seals are arranged to prevent leakage of the liquid between the base and cover.

14. The flow sensor package of Claim 11, wherein the seal comprises a pair of elastomeric seals, and wherein the sensing element is between the elastomeric seals.

15. The flow sensor package of Claim 11, wherein the inlet, the outlet, and the second channel are arranged to permit a flow of the liquid through the housing between the inlet and the outlet.

16. The flow sensor package of Claim 15, wherein the seal has a conductive path from the sensing element to a lead, and wherein the lead extends outside of the housing.

17. The flow sensor package of Claim 11, wherein the inlet, the outlet, and the second channel are arranged to permit a bidirectional flow of the liquid through the housing between the inlet and the outlet.

18. The flow sensor package of Claim 17, wherein the seal has a conductive path from the sensing element to a lead, and wherein the lead extends outside of the housing.

19. The flow sensor package of Claim 11, wherein the seal has a conductive path from the sensing element to a lead, and wherein the lead extends outside of the housing.

20. A method of determining flow rate through a flow conductor comprising the following steps of:

creating a pressure change within a housing having only two separate housing portions;

sensing the pressure change using a sensing element mounted within the housing;

sealing the sensing element within the housing using a seal; and

communicating an electrical signal from the sensing element to an exterior of the housing.

21. The method of Claim 20, wherein the sealing step comprises the step of sealing leakage between the two separate portions of the housing.

22. The method of Claim 20, wherein the sealing step comprises the step of sealing the sensing element between a pair of elastomeric seals which capture the sensing element therebetween.

23. The method of Claim 20, wherein the communicating step comprises the step of communicating the electrical signal from the sensing element through the seal to an exterior of the housing.

24. The flow sensor package of Claim 1, wherein the seal comprises an elastomeric seal.